


SHATENSHTEYN, A. I.

600

1. SHATENSHTEYN, A. I.: IZRAILEVICH, Ye. A.

2. USSR (600)

"The Physico-Chemical Properties of Solutions in Liquefied Gases--25. Methods of Spectrophotometry of Solutions in Liquefied Gases," Zhr. Fiz. Khim, 13, No. 12, 1939. Physico-Chemical inst. imeni Karpov, Lab. of Liquefied Gases. Received 22 July 1939.

9.  Report U-1615, 3 Jan. 1952.

**Chemistry of solutions in liquid ammonia.** A. I. Shatenshteln. *Uspekhi Khim.* 9, 950-4 (1940); cf. C. A. 35, 2705<sup>g</sup>.—Review of American literature. F. H. R.

A S M S L A METALLURGICAL LITERATURE CLASSIFICATION

**CIA-RDP86-00513R001548710015-9"**

1ST AND 2ND ORDERS													3RD AND 4TH ORDERS												
PROCESSES AND PROPERTIES INDEX																									
<p><i>CR</i></p> <p>Spectrophotometry of solutions in liquefied gases. Absorption spectra of solutions of nitro and azo compounds in liquid ammonia in the visible region. A. I. Shatenshtein and E. A. Israilevich. <i>Acta Physicochim. U.S.S.R.</i> 12, 73-88(1940)(in German).—Exptl. data on the absorption spectra of various mono- and poly-nitrobenzenes and phenols, nitroanilines, azo- and aminonitrobenzenes, phenolphthalein and phenylazo-<math>\alpha</math>-naphthylamine in liquid <math>\text{NH}_3</math>, <math>\text{KNH}_2</math>, <math>\text{SO}_2</math> and in aq. <math>\text{NaOH}</math> at temps. from <math>-70</math> to <math>+70^\circ</math> show that the acid-base equilibria in solns. vary with the properties of the solvent and the presence of proton acid or nonproton acid-like substances. For phenolphthalein the color change takes place with weaker bases the lower the temp. Presence of <math>\text{OH}</math> or <math>\text{COOH}</math> prevents reaction of <math>\text{NH}_2</math> with nitro groups. Amino-phenols form colored salts on addn. of <math>\text{KNH}_2</math>. Amino-azo compds. react with bases as proton acids while dimethylaminoazo and azoxy compounds react as nonproton acid like substances. Cf. <i>C. A.</i> 33, 7864.</p> <p>P. H. Rathmann</p>																									
<p>ASR-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																									

SHATENSHTEIN, A. I.

Apparatus for the investigation of photochemical prop-  
erties of solutions and the study of reactions in liquefied  
gases under pressure. A. I. Shatenshtein. *Acta Physico-*  
*chim. U. R. S. S.* 13, 601-16 (1940) (in German).—Descrip-  
tion with diagrams of the glass and chrome-nickel steel  
app. used in the Karpov Inst., Moscow. F. H. R.

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
COMMON ELEMENTS																										COMMON VARIABLE INDEX																									
<p>CA</p> <p>PROCESSES AND PROPERTIES INDEX</p> <p>2</p> <p>Physicochemical properties of solutions in compressed gases. XXVII. Methods of measurement of the electric conductivity at increased pressures. A. I. Shatenshtein. <i>J. Phys. Chem. (U. S. S. R.)</i> 15, 974-7 (1941); <i>Eng. C. A.</i> 34, 5753; 35, 2195. —A simple method is described for measuring the elec. cond. of solns. in compressed gases at higher pressures. The app. used was described previously by V. A. Plavkov in a book by Shatenshtein (<i>Compressed Gases as Solvents</i>, in Russian, 1939) and is partly re-described in the text and 1 figure. The expd. deviation from the mean does not exceed 0.06%. Data for solns. of NaCl and KNO<sub>3</sub> in liquid NH<sub>3</sub> are shown in 2 graphs. The molar cond. of NaCl at 18.0° varies from 100 for a dila. of 22 l. per mol. to 150 for 100 l., 230 for 300 l., 300 for 1000 l., 500 for 10,000 l. and 570 for 30,000 l. Values for KNO<sub>3</sub> are 85 for a dila. of 3.0 l. per mol., 115 for 30 l., 225 for 300 l., 320 for 1000 l. and 525 for 10,000 l. F. H. R.</p> <p>ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									



IZPAILEVICH, YE.A.: SHATENSHTEYN, A.I.

Lab of Non-Aqueous Solutions, Physico-Chemical Institute imeni L. Ya. Karpov (1942)

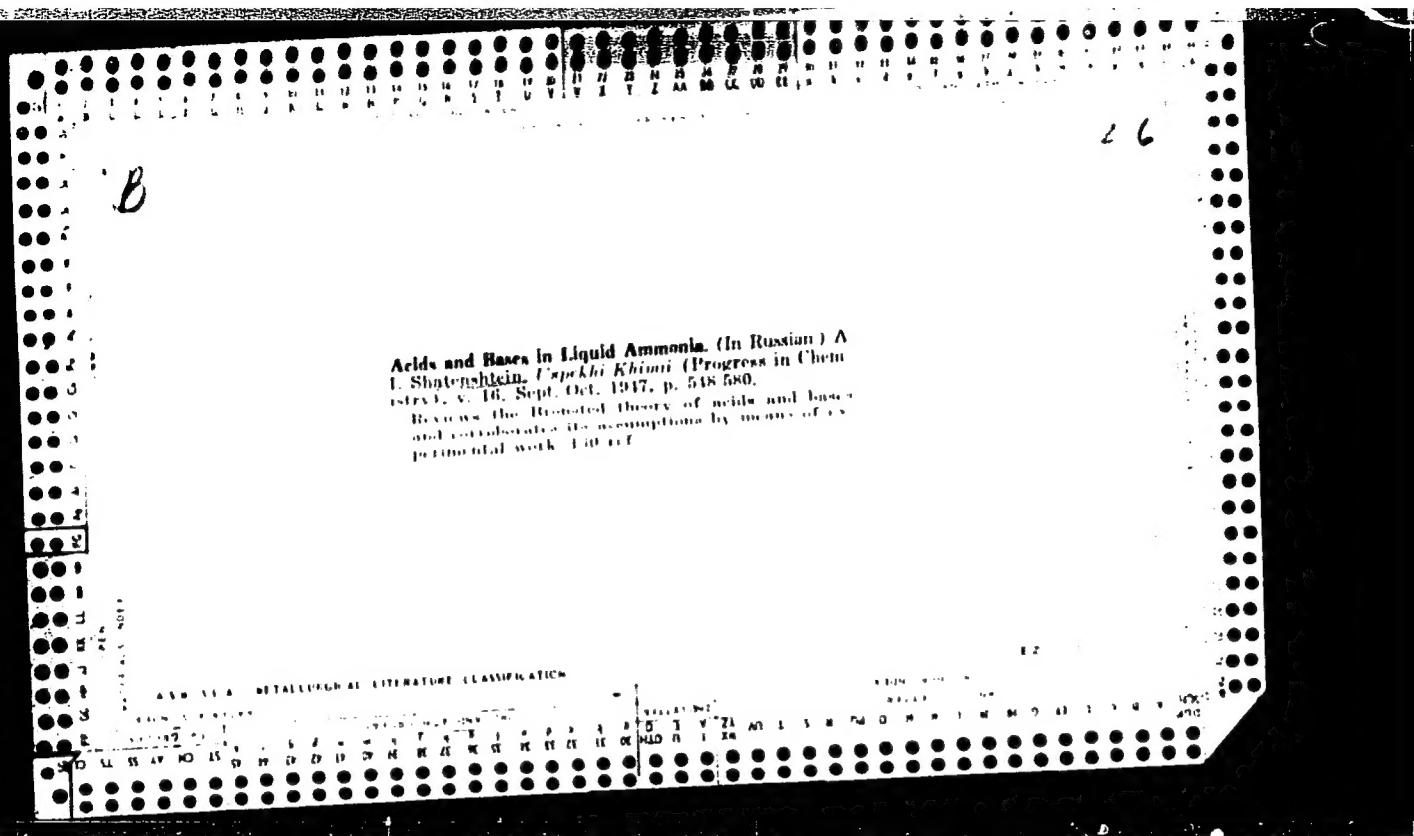
"Physico-Chemical Investigations of Solutions in the Liquefaction of Gases-29.  
Catalytic Activity of Nitro-Indicators in Liquid Ammonia; Salt Effect During  
Ammonolysis of Pilocarpine." Zhur. Fiz. Khim. Vol 17, No. 1, 1943

BR-52059019

1ST AND 2ND COLUMNS										3RD AND 4TH COLUMNS									
PROCESSES AND PROPERTIES INDEX																			
<p>CA</p> <p>2</p> <p>Recent work on Lewis' theory of generalized acids and bases. A. I. Shostakovskii. <i>Doklady Akad. Nauk SSSR</i> 14, 514-52 (1943).—Review of work from 1944 through 1947 with references. N. Thun</p>																			
<p>ABB-11A METALLURGICAL LITERATURE CLASSIFICATION</p>																			







1ST AND 2ND CROPS																										3RD AND 4TH CROPS																									
PROCESSES AND PROPERTIES INDEX																										PROCESSES AND PROPERTIES INDEX																									
<p>4</p> <p>3</p> <p>Absorption spectra of solutions of aromatic nitro compounds in solvents having labile hydrogen atoms. A. Shatenstein and Ya. M. Varshavskii (Karpov Inst. Phys.-Chem., Moscow). <i>J. Phys. Chem. (U.S.S.R.)</i> 22, 520-30 (1948); cf. preceding abstr. The hypothesis attributing the coloration of nitro-compd. solns. in <math>\text{NH}_3</math>, etc., to complex formation between acidic solutes and basic solvents is confirmed by detg. the spectra in other solvents having labile H atoms. This hypothesis accounts for the color reaction of Janovsky (<i>Ber.</i> 24, 971 (1901)). The spectra of nitrated phenols in alk. acetone are very similar to those in 0.005 N NaOH, but the max. are shifted toward the red for 2,5-dinitrophenol (65 and 47 <math>\mu</math> for the two bands) &gt; <i>m</i>-nitrophenol &gt; 3,5- &gt; 2,6- &gt; <i>p</i>- &gt; 2,4- &gt; picric acid &gt; <i>o</i>-nitrophenol (16 <math>\mu</math>). The spectra between 450 and 680 <math>\mu</math> of a dinitroxylenes (m.p. 90°), <i>m</i>-dinitrobenzene, 2,4-dinitrotoluene, and 2,4-dinitroanisole in liquid <math>\text{NH}_3</math>, and in 0.005 N NaOH in acetone are similar. The absorption max. of the fresh solns. are at 635 (in <math>\text{NH}_3</math>) and 652 (in acetone), 555 and 568, 558 and 578, and 539 and 555 <math>\mu</math>; the position of the max. varies little but the intensity of coloration decreases strongly with time (hrs.). J. J. Bikerman</p>																																																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			

USSR/Chemistry - Phenols, Nitro Derivatives Apr 1948  
Chemistry - Ammonium

"Absorption Spectra and Electrical Conductivity of  
Solutions of Nitro- and Polynitrophenols in Liquid  
Ammonium," N.M. Dykino, A.I. Shatenshteyn, *Phys Chem  
Inst Imeni L.Ya. Karpov, Moscow*, 124 pp

"Zhur Fiz Khim" Vol XXII, No 4

Study of absorption spectra of solutions of o-, p-,  
and m-nitrophenols, 2,4-, 2,6-, 2,5-, 3,5-dini-  
trophenol and picric acid in liquid ammonium and in  
diluted alkali waters (0.001M) at room temperatures.  
Also studies the electrical conductivity of solutions  
of all above-mentioned substances in liquid ammonium  
at temperatures of 25 and -78°. Submitted 1 Jul  
1947.

SHATENSHTEYN, A. I.

67715

USSR/Chemistry - Phenols, Nitro  
Derivatives  
Chemistry - Hydrazine  
Apr 1948

"Absorption Spectra of Solutions of Nitro- and  
Polynitrophenols in Anhydrous Hydrazine," Ya.M.  
Varehevskiy, A.I. Shatenshteyn, Phys Chem Inst  
iment L.Ya. Karpov, Moscow, 71 pp

"Zhur Fiz Khim" Vol XXII, No 4

Measure absorption spectra of solutions of nitro-  
and polynitrophenols in anhydrous hydrazine. Due  
to the unstable nature of hydrazine in the presence  
of air, develop method whereby preparation of the  
solution and photography of the spectrum is done  
in media lacking air. Submitted 1 Jul 1947.

SHATENSHTEYN, A. I.

67716

USER/Chemistry - Nitro Compounds  
Chemistry - Spectra, Absorption

May 1948

"Absorption Spectra of Solutions of Aromatic Nitro Compounds in Solvents With Free Atoms of Hydrogen,"  
A. I. Shatenshteyn, Ya. M. Varshavskiy, Phys Chem  
Inst Imeni L. Ya. Karpov, Moscow, 11 pp

"Zhur Fiz Khim" Vol XXII, No 5

Describes absorption spectra experiments using (1) solutions of nitro- and polynitrophenolates in alkaline acetone and (2) solutions of meta-dinitro compounds in liquid ammonia and alkaline acetone. Results are shown graphically. Considers results obtained confirm interpretation of complex formation of aromatic nitro compounds in liquid ammonia as a reaction of acid-base type. Comparison of absorption spectra strengthens hypothesis whereby band shift in absorption spectra of these compounds is attributed to formation of complex ions. Submitted 1 Jul 1947.

68r28

CA

Shatenstein, A. I.: Teoriya Kislot i Osnovaniy; Istoriya i Sovremennoe Sostoyaniye (Theory of Acids and Bases; History and Modern Status). Moscow-Leningrad: Goskhimizdat. 1949. R18. Reviewed in *Uspekhi Khim.* 18, 376(1949).

ASMA SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND SERIES

3RD AND 4TH SERIES

5TH AND 6TH SERIES

7TH AND 8TH SERIES

9TH AND 10TH SERIES

11TH AND 12TH SERIES

13TH AND 14TH SERIES

15TH AND 16TH SERIES

17TH AND 18TH SERIES

19TH AND 20TH SERIES

21ST AND 22ND SERIES

23RD AND 24TH SERIES

25TH AND 26TH SERIES

27TH AND 28TH SERIES

29TH AND 30TH SERIES

31ST AND 32ND SERIES

33RD AND 34TH SERIES

35TH AND 36TH SERIES

37TH AND 38TH SERIES

39TH AND 40TH SERIES

41ST AND 42ND SERIES

43RD AND 44TH SERIES

45TH AND 46TH SERIES

47TH AND 48TH SERIES

49TH AND 50TH SERIES

51ST AND 52ND SERIES

53RD AND 54TH SERIES

55TH AND 56TH SERIES

57TH AND 58TH SERIES

59TH AND 60TH SERIES

61ST AND 62ND SERIES

63RD AND 64TH SERIES

65TH AND 66TH SERIES

67TH AND 68TH SERIES

69TH AND 70TH SERIES

71ST AND 72ND SERIES

73RD AND 74TH SERIES

75TH AND 76TH SERIES

77TH AND 78TH SERIES

79TH AND 80TH SERIES

81ST AND 82ND SERIES

83RD AND 84TH SERIES

85TH AND 86TH SERIES

87TH AND 88TH SERIES

89TH AND 90TH SERIES

91ST AND 92ND SERIES

93RD AND 94TH SERIES

95TH AND 96TH SERIES

97TH AND 98TH SERIES

99TH AND 100TH SERIES

SHATENSHTEYN, A. I.

57/49T106

USSR/Physics  
Gases, Liquefied  
Viscosity

Apr 49

"Methods for Measuring the Viscosity of  
Liquefied Gases," A. I. Shatenshteyn, Ye. A.  
Izrailevich, N. I. Ladyzhnikova, Physicochem  
Inst imeni L. Ya. Karpov, 2 $\frac{1}{2}$  pp

"Zhur Fiz Khim" Vol XXIII, No 4

Describes a capillary viscometer for measuring  
viscosity of compressed gases. Measured viscosity  
of liquid NH<sub>3</sub> at 15, 20, and 25°C. Submitted  
2 Jul 48.

57/49T106



CA

2

**Comparison of the strength of very weak acids.** A. I. Shatenshtein. *Doklady Akad. Nauk S.S.S.R.* 60, 1029-31 (1950).—The mobility of the H atom in hydrocarbons is evaluated by the rate of its exchange with D in the solvent. Generally, this exchange is either absent or insignificant with D<sub>2</sub>O or with deuterioalk., even in the presence of alkali, but is significant with liquid ND<sub>3</sub> as solvent, particularly in the presence of dissolved NH<sub>4</sub>K which creates a strongly alk. medium. With  $\alpha$  = distribution coeff. of D between the org. compd. and the solvent,  $n$  = no. of H atoms exchanged for D, the following exptl. values of  $\alpha n$  were found by  $\alpha n = N_e/c_0$  (where  $N_e$  = total no. of H atoms in the org. compd.,  $c$  and  $c_0$  = concn. of D in the combustion water of the org. compd. and the solvent after the exchange), in D<sub>2</sub>O or deuterioalk., in ND<sub>3</sub>, and in ND<sub>3</sub> with 0.25 *N* NH<sub>4</sub>K: indene 0.01 (100°, 5 hrs.), 1.16 (0°, 3 hrs.), 1.9 (20°, 5 min.); acetophenone 0.14 (110°, 97 hrs.), 0.21 (0°, 3 hrs.), 2.4 (20°, 5 min.); fluorene 0 (25°, 3500 hrs. and 110°, 670 hrs.), 0.12 (25°, 1 hr.) and 1.6 (120°, 10 min.), 0.18 (20°, 5 min.); *p*-nitrotoluene 0 (110°, 48 hrs.), 1.8 (120°, 48 hrs.). —;

triphenylmethane (alk.) 0 (100°, 3600 hrs.), 0.08 (120°, 72 hrs.), 0.7 (50°, 24 hrs.); naphthalene 0.03 (120°, 90 hrs.), 7.1 (25°, 9 hrs.); diphenylmethane 0 (25°, 3500 hrs.), 0.03 (120°, 98 hrs.), 2.6 (50°, 120 hrs.); toluene (alk.) 0 (150°, 80 hrs.), —, 2.2 (120°, 144 hrs.). The exptl. orders of magnitude of the 1st-order rate consts. of the H-D exchange in liquid ND<sub>3</sub>, in min.<sup>-1</sup>, are: indene  $1 \times 10^{-3}$  (25°),  $6 \times 10^{-4}$  (120°); acetophenone  $3 \times 10^{-3}$  (25°); fluorene  $4 \times 10^{-3}$  (25°),  $2 \times 10^{-3}$  (50°),  $1 \times 10^{-3}$  (120°); *m*-dinitrobenzene  $2 \times 10^{-3}$  (150°); *p*-nitrotoluene  $1 \times 10^{-4}$  (25°),  $4 \times 10^{-4}$  (50°),  $6 \times 10^{-4}$  (120°);  $\alpha$ -picoline  $2 \times 10^{-4}$  (120°); quinaldine  $1 \times 10^{-4}$  (120°); triphenylmethane  $2 \times 10^{-4}$  (120°); acenaphthene  $2 \times 10^{-4}$  (120°); naphthalene  $6 \times 10^{-4}$  (120°);  $\text{HCO}_2\text{Na}$   $6 \times 10^{-4}$  (120°);  $\text{AcONa}$   $4 \times 10^{-4}$  (120°); diphenylmethane  $3 \times 10^{-4}$  (120°). MeOH, PhNH<sub>2</sub>, and *p*-MeC<sub>6</sub>H<sub>4</sub>NH<sub>2</sub>, at 25°, exchange instantaneously. For compds. in which H is bound with C there is a parallelism between the exchange-rate consts. and the ionization consts. of Conant and Wheland (*C.A.* 26, 2436) and of McEwen (*C.A.* 30, 6366), except for a reversal in the case of indene and of acetophenone.

N. Thon

SHATENSHTEYN, A. I.

USSR/Chemistry - Nitro Derivatives Jun 51

"Absorption Spectra and Electrical Conductivity of Solutions of Nitronaphthols in Liquid Ammonia," N.M. Dykhn, A. I. Shatenshteyn, Phys Chem Inst imeni L. Ya. Karpov, Moscow

"Zhur Fiz Khim" Vol XXV, No 6, pp 670-681

Measured absorption spectra of 4-nitro-1-, 1-nitro-2-, 2-nitro-1-, 8-nitro-2-naphtholates in both dil aq alkali and liquid  $\text{NH}_3$  and elec cond of these isomers and 5-nitro-1-naphtholate in liquid  $\text{NH}_3$  at 25 and -780 C. With m-nitro- and 2,4-dinitrophenolates proved reversibility of spectral changes of

206T10

USSR/Chemistry - Nitro Derivatives (Contd) Jun 51

nitrophenolates in liquid  $\text{NH}_3$ . Measured absorption spectra of solns of m-nitrophenolate in liquid  $\text{NH}_3$  with admixt of  $\text{NH}_4\text{Cl}$ . Noted similarity among spectra of phenolates, aniline, and their nitro derivs, and among spectra of naphtholates, naphthylamines, and their nitro derivs.

206T10

USSR/Chemistry - Isotope Exchange

Oct 51

"Comparison of the Strengths of Very Weak Acids,"

A. I. Shatenshteyn, Moscow

"Zhur Fiz Khim" Vol XXV, No 10, pp 1206-1213

Examn of isotope exchange of hydrogen by certain org compds in liquid  $\text{ND}_3$  showed that exchange under these conditions proceeds much more rapidly than in  $\text{D}_2\text{O}$  or deuteroalc, due to the fact that ammonia is more highly protophilic. Addn of base (Kamide) to  $\text{ND}_3$  increases rate of isotope exchange even more. Compares rate consts of exchange reactions in  $\text{ND}_3$  with conventional ionization consts from the literature.

19415

USSR/Chemistry - Aromatic Compounds; 21 Jul 51  
Isotopes

"Mobility of Hydrogen in Aromatic Compounds," A. I. Shatenshteyn, N. M. Dykino, Ye. A. Izraelovich, I. N. Vasil'yeva, M. Fayrush, Sci Res Phys Chem Inst imeni L. Ya. Karpov

"Dok Ak Nauk SSSR" Vol LXXIX, No 3, pp 479-482

Using liquid deuterio-ammonia in the presence of potassium amide, found that rate of isotope exchange increases with the number of rings from benzene to phenanthrene. All hydrogen atoms in toluene, m-xylene, mesitylene, methylnaphthalene,

211724

anisole, methoxynaphthalene, dimethylaniline, triphenylmethane, and fluorene are exchanged. In completely hydrogenated aromatics the rate of exchange is greatly impeded. Electroneg substituents increase the rate of exchange while electropos substituents reduce it. In toluene, the rate of exchange of methyl hydrogen atoms is 100 times greater than that of nuclear hydrogen atoms.

SHATENSHTEYN, A. I.

211724

SHATTOV, A. I.

Hydrocarbons

Investigation of the reactivity of hydrocarbons in solutions by isotope exchange of hydrogen. *Usp. Khim.* 31 no. 3, 1952.

Monthly List of Russian Acquisitions Library of Congress, November 1952. UNCLASSIFIED.

CHLOROFLUOROETHANE: VOLKOVICH, N. V.

Chlorofluoroethane

Physicochemical constants of 1, 2-chlorofluoroethane. Zhur. ob. Khim. 22 no. 7, 1946.

9. Monthly List of Russian Accessions, Library of Congress, November <sup>1952</sup> ~~1952~~. Unclassified.

CHATENSHTEYN, A. I.

USSR/Chemistry - Nitro Compounds Mar 52

"Absorption Spectra of Solutions of Complexes of Nitro and Azo Compounds With Potassium Amide in Liquid Ammonia," A. I. Shatensteyn, Ye. A. Izraellevich, Phys Chem Inst Imeni L. Ya. Karpov, Moscow

"Zhur Fiz Khim" Vol XXVI, No 3, pp 377-387

Shows that the reason for changes in the long-wave region of spectra of aromatic nitro compounds brought about by liquid  $NH_3$  is formation of acid-base complexes under participation of  $NH_2^+$  ions. Azo and azoxy compounds existing in the form of anions form colored complexes with  $NH_2^+$  ions 213T33

just as nitro compounds do. Suggests comparative investigation of azo compounds in the form of anions, neutral molecules, and cations.

213T33

SHATENShteIN, A.I.

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USSR/Chemistry - Reaction, Kinetics  
Deuterium

1 Jul 52

"The Reaction Capacity of Some Aromatic Compounds,"  
A. I. Shatenshtein, Ya. M. Varshavskiy

"Dok Ak Nauk SSSR" Vol LXXXV, No 1, pp 157-160

A study of the reaction capacity of org substances as related to their constitution and the nature of the reaction medium is conducted by measuring the rate of isotopic exchange of hydrogen. In this work a systematic investigation of exchange reactions of aromatic org substances in acid medium is begun. The solvent used is deuterium bromide. For the study in alk medium, deuterioammonia is used.  
Presented by Acad A. N. Frumkin 7 May 52. 224T23



Hydrocarbons

Mobility of hydrogen in some hydrocarbons. Dokl. AN SSSR 85 no. 2, 1952.

7. THE ONLY LIST OF RUSSIAN ACCESSIONS, Library of Congress, November 1952. Uncl.

Shatenshteyn, A. I.

USSR/Chemistry - Conferences

Card : 1/1 Pub. 123 - 6/19

Authors : Shatenshteyn, A. I. Dr. of chem. sc.

Title : On the theories of acids and bases

Periodical : Vest. AN Kaz. SSR 12, 32 - 50, December 1953

Abstract : Minutes of a scientific session called by the Academy of Sciences Kaz-SSR, Alma-Ata for the purpose of discussing the theories regarding acids and bases (compounds reacting with acids). Speeches and notes of various chemists, are included. Thirty eight references: 23-USSR; 7-USA; 5-German; 1-Swedish and 2-English (1937-1953).

Institution : Acad. of Sc. Kaz. SSR, Alma-Ata

Submitted : ...

KALINACHENKO, V.R.; VARSHAVSKIY, Ya.M.; SHATENSHTEYN, A.I.; SEMENOV, N.N., akademik.

Study of the reactivity of aromatic compounds with the use of the method of isotopic exchange with deuterium bromide. Dokl.AN SSSR 91 no.3:577-580 J1 '53. (MLRA 6:7)

1. Akademiya nauk SSSR (for Semenov).  
(Aromatic compounds) (Hydrogen--Isotopes)

SHATEL/SHIRYN, A. I.

Nuclear Science Abstracts  
July 15, 1954  
Chemistry

ISOTOPIC EXCHANGE OF HYDROGEN IN HYDROCARBONS  
IN A LIQUID MEDIUM OF DEUTERIUM FLUORIDE. Ya.  
M. Varslavskii and A. I. Stetsko. Doklady Akad. Nauk  
S.S.S.R. 99, 267(1953) Mar. 11. (In Russian)

The mechanism of the rate of D exchange between D-enriched HF and hydrocarbons was investigated. D-enriched HF was produced by the isotopic exchange reaction of HF and heavy water. Isotopic exchange was measured between DF and the hydrocarbons benzene, toluene, anthracene, phenyl methyl ether, dimethylaniline, naphthalene, phenanthrene, diphenyl methane, triphenyl methane, chlorobenzene, tetraline, decalin, cyclohexane, methycyclohexane, hexane, and heptane. The rate of exchange is explained by the probable generation of fluorine oxide during the preparation of D-enriched HF. (J.S.R.)

9-17-54  
JSP

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

<u>Name</u>	<u>Title of Work</u>	<u>Nominated by</u>
Shtrom, I. I.	"Investigations in the Theory of Acids and Bases, and Study of the Reaction Capacity of Organic Substances by the Method of Cationic Exchange of Hydrogen and Basic and Acidic Media"	Ministry of the Chemical Industry.

SC: W-30604, 7 July 1954

SHATENSHTEYN, A. I.

USSR/Physics - Spectral analysis

Card 1/1 Pub. 43 - 12/62

Authors : Landsberg, G. S.; Shatenshteyn, A. I.; Peregudov, G. V.; Izrael'evich, Ye. A.; and Novikova, L. A.

Title : Oscillation spectra of diphenyl and decadeuterodiphenyl molecules

Periodical : Izv. AN SSSR. Ser. fiz. 18/6, 669-671, Nov-Dec 1954

Abstract : The oscillation spectra of  $C_{12}H_{10}$  and  $C_{12}D_{10}$  and the depolarization of combined diffusion spectra were investigated and the importance of such studies for theoretical interpretation and calculation of spectra is explained. New possibilities for the derivation of deuterated arom. hydrocarbons discovered during the study of isotopic exchange reaction in liquid deuterio-ammonia in the presence of potassium amide are briefly discussed. The number and possible types of oscillations of the hydrocarbon molecules are tabulated. Five USSR references (1950-1954). Tables

Institution : Acad. of Sc., USSR, The P. N. Lebedev Physics Inst. and the L. Ya. Karpov Phys.-Chem. Inst.

Submitted : .....

SHATENSHTEYN, A.I.

USSR/ Chemistry - Physical chemistry

Card 1/1      Pub. 147 - 1/26

Authors : Shatenshteyn, A.I., and Izrailevich, E. A.

Title : Rate of isotopic hydrogen exchange reaction in benzene and naphthalin during catalysis with a potassium amide solution in liquid deuterated ammonia.

Periodical : Zhur. fiz. khim. 28/1, 3-10, Jan 1954

Abstract : The method employed in measuring the rate of isotopic hydrogen exchange reaction in organic substances during the catalysis with potassium amide in a liquid deuterated Am is described. The measurements were carried out at 0.25, 10.5, 25 and 40° and the energy required for the activation of the exchange reaction was determined. The results obtained are tabulated. Twelve references : 8-USSR; 1-USA and 3-German (1927-1952). Tables.

Institution : ....

Submitted : August 2, 1952

SHATENSHTEYN, A. I.

USSR/Chemistry - Physical chemistry

Card 1/1      Pub. 147 - 2/26

Authors : Dykhno, N. M., and Shatenshteyn, A. I.

Title : Mobility of hydrogen in toluene

Periodical : Zhur. fiz. khim. 28/1, 11-13, Jan 1954

Abstract : The rate of isotopic hydrogen exchange reaction was measured in a methyl group and in an aromatic toluene ring during the action of a liquid  $\text{KNH}_2$  solution in deuterated Am to determine the mobility of the hydrogen in toluene. It was found that the hydrogen in the methyl group changes into deuterium approximately 50 times faster than the hydrogen in the aromatic toluene ring. The hydrogen in the aromatic toluene ring changes at an average of 4 times slower than the hydrogen in the non-substituted benzene. Six USSR references ( 1950-1954). Tables.

Institution : .....

Submitted : August 12, 1952



SHATENSHTEYN, A. I.

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 147 - 3/26

Authors : Dykhno, N. M., and Shatenshteyn, A. I.

Title : Mobility of hydrogen in tetralin

Periodical : Zhur. fiz. khim. 28/1, 14-18, Jan 1954

Abstract : The method of isotopic hydrogen exchange in a medium of liquid deuterated Am during catalysis with a  $K_2H_2$  solution was utilized to determine the relative mobility of hydrogen atoms in a tetralin molecule. It was established that the three types of hydrogen atoms existing in a tetralin molecule have different mobility. The four hydrogen atoms of the hydrogenated ring (hydrogen atoms of alpha-methylene groups), were found to be the most mobile ones. The four hydrogen atoms of the hydrogenated ring (hydrogen atoms of beta-methylene groups), like the hydrogen atoms of decalin cannot be exchanged into deuterium. Five references : 4-USSR and 1-USA. (1932-1954). Tables.

Institution : .....

Submitted : August 2, 1952

*Shatenshteyn, A.I.*

USSR/Chemistry - Physical chemistry

Card 1/1      Pub. 147 - 1/27

Authors      : Shatenshteyn, A.I.; Vasilyeva, L. N.; and Dykhno, N.M.

Title        : Mobility of hydrogen in ethylene hydrocarbons

Periodical   : Zhur. fiz. khim. 28/2, 193-198, Feb 1954

Abstract     : The results, obtained during the first series of experiments with pentene-1, pentene-2, hexene-1, heptene-1, octene-1, octene-2, cetene, 2,4,4-trimethylpentene-1 and cyclohexene, are presented. It was established that isotopic exchange of all hydrogen atoms in alkene-1 molecules, with straight chain of C-atoms ( from C<sub>5</sub> - C<sub>16</sub>), is possible during the catalysis with potassium amide in liquid deuterated Am. It was also found that a potassium amide solution in liquid ammonia causes the isomerization of the ethylene hydrocarbons. The mobility of hydrogen atoms in a hydrocarbon with quaternary C-atom is explained. Eight references : 7-USSR and 1-USA (1949-1954). Tables.

Institution : . . . .

Submitted   : August 2, 1952

SHATENSHTEIN, A. I.

1 RAIL

10922\* Interactions of Atoms in Molecules of Certain  
Aromatic Hydrocarbons According to the Experiments on  
Isotopic Hydrogen Exchange. (Russian.) A. I. Shatenshtein,  
and E. A. Izraelovich. Doklady Akademii Nauk SSSR, v. 91, no.  
5, Feb. 11, 1954, p. 923-926.  
Investigates toluene, ethyl-, isopropyl-, and tert-butylbenzene.  
Tables 5 ref.

Shatenshtein, A.I.

10858\* Mutual Influence of Atoms in Molecules of Certain Ethylene Hydrocarbons According to Experiments With Isotopic Exchange of Hydrogen. (Russian.) A. I. Shatenshtein and L. N. Vasil'eva. *Doklady Akademii Nauk SSSR*, v. 83, no. 1, Mar. 1, 1954, p. 115-118.  
Substantiates basic assumptions. Graph, table. 3 ref.

Chem

4  
IRML

SHATENSHTEYN, A.I.

Hydrogen isotope interchange in hydrocarbons in a liquid deuterium fluoride medium. Ya. M. Varshavskii and A. I. Shatenshteyn. *Doklady Akad. Nauk S.S.S.R.* 93, 297-9 (1954).—The effect was studied of the dielec. const. of the medium on the mechanism of double exchange reactions. Because of the high dielec. const. of HF (176 at  $-78^{\circ}$ , 84 at  $0^{\circ}$ ), DF was selected as the solvent (dielec. const. of HBr 6 at  $-80^{\circ}$ ), and was expected to favor the ionization of hydrocarbons, which was confirmed by Kilpatrick and Luborsky (*C.A.* 47, 7867e). The soly. of the samples of hydrocarbons (0.2 g. in 20 g. HF) was tested, and benzene, toluene, anthracene, anisole, and dimethylaniline were sol. at 25 and  $50^{\circ}$ , whereas naphthalene, phenanthrene,  $\text{Ph}_2\text{CH}_2$ ,  $\text{Ph}_3\text{CH}$ ,  $\text{PhCl}$ , Tetralin, Decalin, cyclohexane, hexane, and heptane were either only partially sol. or insol. The D-exchange rate const. in benzene in a DF soln. is on the order of  $10^4$  greater than in HBr. The H atoms in the toluene side-chain were not exchanged for D in 1000 hrs., whereas all the ring atoms were exchanged in 15 min. at  $25^{\circ}$ , whereas all the ring atoms were exchanged, as found with  $\text{BF}_3$  addn. to DF accelerates the exchange, as found with cyclohexane, which exchanged its H atoms only slowly in the absence of DF. The H atoms connected to tertiary C atoms are readily exchanged for D. The method of prepn. of  $\text{F}_2\text{O}$  may not have excluded the possibility of formation of  $\text{F}_2\text{O}_2$ , which, being an oxidizing agent, could have accelerated the exchange. W. M. Sternberg ①

H

AID P - 2805

Subject : USSR/Chemistry

Card 1/1 Pub. 119 - 1/7

Author : Shatenshteyn, A. I. (Moscow)

Title : Hydrocarbons as acids and bases

Periodical : Usp. khim. 24, 4, 377-429, 1955

Abstract : Review of the literature covering the mechanism of oxidation-reduction reactions. The most sensitive reactions for the determination of the acidity or basicity of hydrocarbons are isotopic exchange reactions of hydrogen. Eight tables, 233 references, 64 Russian (1910-1955).

Institution : None

Submitted : No date

SHATENSHTEYN, A.I.

2  
 Mutual effect of atoms in molecules of some ethylenic hydrocarbons on the exchange of isotopic hydrogen. A. I. Shatenshteyn and L. N. Vasil'eva. *Doklady Akad. Nauk S.S.S.R.* 95, 115-118 (1955); cf. *C.A.* 43, 6930c. In liquid  $\text{ND}_3$ , in the presence of  $\text{KND}_2$  as catalyst, all H-atoms of alkenes can be exchanged for D. This was observed even in the case of hexadecenes. Allylic bond and asymmetry in the mol. facilitate the exchange. The exchange is accompanied by the migration of the double bond along the chain. In 2,4,4-trimethyl-1-pentene exchange was absent in the part of the mol. which was sepd. from the double bond by a tertiary C. This was also verified for  $\text{CH}_3\text{CHCH}_2\text{CMe}_2\text{CMe}_2\text{CH}_2\text{CH}_2\text{CH}_3$ ,  $\text{MeCH}_2\text{CH}_2$  (I), and  $\text{Me}_2\text{CCH}_2$  (II). Initial exchange velocity consts. for I are  $\sim 10^{-4}/\text{sec.}$  and for II  $\sim 7 \times 10^{-4}/\text{sec.}$  In an alk. medium the H atoms in those C-H bonds which make up the pos. end of the dipole are most mobile. This effect is postulated to account for differences in exchange consts. for II and  $\text{Me}_2\text{CCH}_2$  (III), with  $k = 7 \times 10^{-4}$  and  $1.3 \times 10^{-4}/\text{sec.}$ , resp. If one Me in III is replaced by H, an asymmetry and consequently a dipole moment ( $\mu = 0.47\text{D.}$ ) is created, then the exchange increases to  $\sim 5 \times 10^{-4}/\text{sec.}$  Michael Dymicky

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 33/53

Authors : Shatenshteyn, A. I.; Zhdanova, K. I.; Vinogradov, L. N.; and Kalinachenko, V. R.

Title : About oxygen catalysis of isotopic hydrogen exchange in a liquid deuterium bromide medium

Periodical : Dok. AN SSSR 102/4, 779-782, Jun 1, 1955

Abstract : Experiments were carried out with twenty substances containing halide, nitro, cyan, sulfo or carboxyl groups to determine the solubility of these substances in liquid DBr in the presence of  $AlBr_3$  and their stability and behavior in the solution. It was found that the isotopic hydrogen exchange observed in certain saturated hydrocarbons mixed with  $D_2SO_4$ , DBr -  $AlBr_3$ , DF and DF -  $BF_3$  is evidently connected with the exclusively high acidity of the medium. The results of the experiments carried out at room temperature are tabulated. Twenty-two references: 12 USA, 9 USSR and 1 German (1935-1954). Table.

Institution : The L. Ya. Karpov Sc. Res. Physicochemical Inst.

Presented by : Academician V. A. Kargin, February 24, 1955



SHATENSHTEYN, A.I.

✓ 5549

ON THE EFFECTS OF SUBSTANCE CHARGE AND SOLVENT  
DIELECTRIC CONSTANT ON THE RATE OF HYDROGEN  
EXCHANGE. A. I. Shatenshtein and E. A. Yakovleva  
(Karpov Physico-Chemical Research Inst.) Doklady Akad.  
Nauk S.S.S.R. 105, 1024-7(1955) Dec. 11. (in Russian).

*chem* Laboratory studies with hydrocarbon solutions in liquid  
deuterioammonium and deuterium bromide have established  
the dependence of the rate of exchange on the protolytic  
properties of the substances between which the exchange re-  
action takes place. A correlation is established between the  
rate of the hydrogen exchange with the charge of the sub-  
stance and the dielectric constant of the solvents. These are  
the parameters determining the state of the acid-base equi-  
librium. (R.V.J.)

*PM*

USSR/Optics - Spectroscopy.

K-6

Abs Jour : Referat Zhur - Fizika, No 3, 1957, 7905

Author : Landsberg, G.S., Shabenshteyn, A.I., Peregonov, G.V.,  
Izrayeleirich, Ya.A., Novikova, L.A.

Title : Vibrational Spectra of Diphenyl and Dekadeuterodiphenyl.

Orig Pub : Optika i spektroskopiya, 1956, 1, No 1, 34-40

Abstract : A method is developed for producing dekadeuterodiphenyl by means of an isotopic exchange reaction between the diphenyl and deuterio-ammonia in the presence of potassium amide. A scattering vessel with a volume of 0.5 -- 1 cc was constructed and a setup was developed for a qualitative determination of the degree of depolarization of the lines. The spectra of red and infrared absorption were studied with the aid of a Euet B II 11 and an infrared spectrophotometer developed by the FIAN (Physics Institute, Academy of Sciences). The spectra of the fundamental frequencies of both substances are given.

Card 1/1

- 86 -

SHATENSHTEYN, A.I.

Mechanism of the hydrogen exchange in solutions. Ukr. khim. zhur.  
22 no.1:3-10 '56. (MLRA 9:6)  
(Hydrogen) (Solution (Chemistry))

USSR/Organic Chemistry. Theoretical and General  
Questions of Organic Chemistry.

E-1

Abs Jour : Ref Zhur - Khimiya, No. 8, 1957, 26613.

Author : Kololev, A.; Shatenshteyn, A.<sup>1</sup>, Yurygina,  
Ye., Kalinachenko, V., Alikhanov, P.

Inst :  
Title : Isomerization of Monodeuteronaphthalenes.

Orig Pub : Zh. obshch. khimii, 1956, 26, No. 6, 1666 -  
1672.

Abstract : The question of the possibility of transposi-  
tion of  $\alpha$ -H and  $\beta$ -H in the naphthalene  
molecule was investigated by the method of  
deuterium interchange. It is shown that if  
vapors of  $\alpha$ -deuteronaphthalene, as well of  
 $\beta$ -deuteronaphthalene (I and II) in a flow of  
nitrogen are passing above silica gel at 420°,

Card 1/3

SHATENSHTEYN, A. I.

Isomerization of monodeuterionaphthalenes  
A. Kom-  
lev, A. Shatenshtein, E. Yurygina, V. Kalinachenko, and P.  
Ankharov. J. Gen. Chem. U.S.S.R. 26, 1869-75 (1956)  
(English translation).—See C.A. 51, 19136. B. M. R...

4E4 - 1

PM 6/2/56

SHATENSHTEYN, A.I.

In reference to the article "Exchange reactions of deuterated benzene derivatives with potassium amide in liquid ammonia." Zhur. fiz.khim. 30 no.3:714 Mr '56. (MLRA 9:8)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova, Moskva.  
(Benzene) (Deuterium)

SHATENSHTEYN, A-I

138

METHOD FOR INVESTIGATION OF HYDROGEN ISOTOPIC EXCHANGE IN LIQUID DEUTERIUM BROMIDE. V. R.

Kaltnachenko, Ya. M. Varshavskii, and A. I. Shatenshtein, (Karpov Moscow Physico-Chemical Inst.). Zhur. Fiz. Khim. 30, 1140-3 (1956) May. (In Russian)

Descriptions are given of an apparatus for the preparation and isotopic analysis of DBr, and of the procedure for investigating the isotopic exchange of H between organic compounds and liquid hydrogen bromide. (tr-auth)

AM

LFH

SHATENSHTEYN, A. I.

*Handwritten:*  
A.I. Shatenshteyn  
Chem

Determination of the coefficient for the distribution of deuterium in the isotopic exchange of hydrogen between naphthalene and deuterium bromide. Ya. M. Varshavskii, V. R. Kalinachenko, S. B. Valsberg, and A. I. Shatenshteyn (L. Ya. Karpov Phys. Chem. Inst., Moscow). Zhur. Pis. Khim. 30, 1647-51 (1950).—The distribution coeff.,  $\alpha$ , for H exchange was detd. for the system DBr-C<sub>10</sub>H<sub>8</sub> for the temp. range 0-70°. The exptl. values (3.1 at 0°, 3.0 at 20°, 2.8 at 25°, 2.6 at 50°, 2.4 at 70°) were compared with values calcd. by means of a equation derived earlier (C.A. 50, 16301f) and found to agree well. J. Roytar Leach

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SHATENSHTEYN, A. I.

Hydrogen exchange between aromatic hydrocarbons and liquid deuterium bromide<sup>2</sup> (A. I. Shatenshteyn, V. R. Kalinichenko, and Ya. M. Varshavskii (L. Ya. Karpov Phys. Chem. Inst., Moscow). *Zhur. Fiz. Khim.* 30, 2093-7 (1956); cf. *C.A.* 49, 12093f. — The rate of exchange between H and D was studied in solns. of  $C_6H_6$  (I), b. 80.1°; naphthalene (II), m. 80.2°; anthracene (III), m. 217.6°; phenanthrene (IV), m. 99°; pyrene (V), m. 149°; chrysene (VI), m. 253°; biphenyl (VII), m. 69.5°; and terphenyl (VIII), m. 212°, in liquid DBr at temps. 35 to -40°. The  $\alpha$  and the  $\beta$  atoms in naphthalene reacted at different rates, the velocity const. at 0° being correspondingly  $K_\alpha = 2 \times 10^{-4}$ ,  $K_\beta = 6 \times 10^{-4}$ /sec. The percent of H atoms in the condensed ring system at 25° exchanged for D atoms was 50 with II, 100 with III, 80% with IV, and 100% with V. Eight H atoms were replaced in IV, 9 in VII, and 10 in VIII in 42 min., and the replacement reaction does not proceed further when the time is increased to 335 min. The replacement reaction in DBr differs from the reaction in  $ND_3 + KND_2$  by DBr being more selective for replacement in aromatic compds., but no specific replacement is found with  $KND_2$ . The hydrogen replacement between benzene and naphthalene derivatives and deuterium bromide. *Ibid.* 2098-105 (1956). — The reaction rate of H replacement was studied between DBr and the 1- and 2-naphthalene, nitronaphthalenes, 1-naphthonitrile, 2-naphthoic acid, 1-chloro- and bromonaphthalenes, and monoalkyl benzenes (Et, iso-Pr, *tert*-Bu, and Bu) and with polymethylbenzenes (*m*-xylene, mesitylene, durene, and penta-

SHATENSHTEIN, A.I.; KALINACHENKO, V.R.

methylbenzene). The rate of replacement of H atoms with D varied greatly. Methyl naphthalenes and Tetralin reacted so rapidly that rate measurements at 25° are difficult. In 1- and 2-nitronaphthalene, 1-naphthonitrile, and 2-naphthoic acid the exchange velocity constants for the 1st ring-H is on the order of  $10^{-10}$  per sec., whereas for the 1st H in naphthalene  $K = 10^{-8}$ , and for the 2nd H  $K = 6 \times 10^{-7}$ /sec.; in all monoalkyl benzenes  $K = 2-4 \times$

$10^{-7}$ /sec., and only the ring H atoms are replaced. For most polymethyl benzenes, the value for  $s$  was 1.2-1.8 times greater than the no. of unsubstituted ring H atoms, but the assumption of some aliphatic chain H having been replaced appears untenable.

W. M. Sternberg

PM /ra  
MTT

SHATENSHTEYN, A.I.; KALINACHENKO, V.R.; VARSHAVSKIY, Ya.M.

Hydrogen exchange between benzene and naphthalene derivatives and liquid deuterium bromide [with English summary in insert]. Zhur. fiz.khim. 30 no.9:2098-2105 S '56. (MIRA 9:12)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova, Moskva.  
(Hydrocarbons) (Hydrobromic acid-*d*)

SHATENSHTEYN, A.I.; IZRAILEVICH, Ye.A.

Influence of  $\pi$ -electrons in hydrocarbon molecules upon the isotopic exchange of hydrogen in these molecules in the case of catalysis by potassium amide. Dokl.AN SSSR 108 no.2:294-297 My '56. (MIRA 9:9)

1. Laboratoriya izotopnykh reaktsiy nauchno-issledovatel'skogo fiziko-khimicheskogo instituta imeni L.Ya.Karpova. Predstavleno akademikom V.A.Karginym.  
(Hydrocarbons) (Hydrogen--Isotopes)

Distr: 4Elj

✓ Absorption spectra of carbanions. B. A. Izrael'evich,  
D. N. Shigorin, I. V. Astaf'ev, and A. I. Shatenshtat.  
*Doklady Akad. Nauk S.S.S.R.* 111, 617-20 (1956). — The  
absorption spectra of solus. of hydrocarbons in liquid  $\text{NH}_3$   
in the presence of  $\text{KNH}_2$  were detd. in the infrared and vis-  
ible region of the spectrum at room temp. and 8-10 atm.  
to det. the valence state of the solute. The infrared spectra  
of  $\text{Ph}_3\text{CH}$ ,  $\text{Ph}_2\text{CH}_2$ , indene, and quinaldine were taken in  
 $\text{CCl}_4$ ,  $\text{NH}_3$ , and  $\text{NH}_3 + \text{KNH}_2$ . The spectra in the 1st 2  
solvents coincide. The spectra of solns. in  $\text{NH}_3 + \text{KNH}_2$   
indicate the presence of carbonium ions. This was at-  
tributed to the ionization of the H by the  $\text{NH}_2$  group.  
If only a single aromatic ring is attached to the C of the  
 $\text{CH}_3$  or  $\text{CH}_2$  group, as in bibenzyl or in toluene, no signifi-  
cant ionization is brought about by the addn. of  $\text{KNH}_2$ .

J. Rovtar Leach

17.1.

CW

SHATENSHTEYN, A.I., prof.; YAKOVIEVA, Ye.A., kand.khim.nauk; ZVYAGINTSEVA,  
Ye.N.; VARSHAVSKIY, Ya.M., kand.khim.nauk; ISRAILEVICH, Ye.A.,  
kand.khim.nauk; DYKHNO, N.M., kand.khim.nauk; VINOGRADOV, A.P.,  
akademik, otvetstvennyy red.; KHRISTIANOV, V.K., red.izd-va

[Isotopic analysis of water] Izotopnyi analiz vody. Izd. 2-oe.  
Moskva, Izd-vo Akad.nauk SSSR, 1957. 235 p. (MIRA 11:2)  
(Water--Analysis) (Hydrogen--Isotopes)  
(Oxygen--Isotopes)

LAZARUS, M. I., YAGLOVA, Y. I., YAGLOVA, Y. I., LUKIN, Y. A.,  
VARGAS, Y. Y. M., LOZKINA, M. G., VEDELEYEV, A. V.

"Solid-State Catalysis of the Reaction of Isotopic Hydrogen Exchange."

1. The reaction of isotopic hydrogen exchange on the surface of solid catalysts is studied.

2. The reaction of isotopic hydrogen exchange on the surface of solid catalysts is studied.

"Preparation of Deuterium Oxide and Determination of Its Density,"  
by A. I. Shatenshteyn, L. M. Yakimenko, V. R. Kalinachenko, and  
Ye. A. Yakovleva, Zhurnal Neorganicheskoy Khimii, Vol 2, No 5,  
May 57, pp 985-994

Equipment for the preparation of deuterium oxide was designed and heavy water of a high degree of purity prepared. The density of deuterium oxide was determined at the temperatures of 25°, 30°, 40°, and 50°. The work described had been done in 1950, although the paper was contributed on 29 December 1956. (U)



✓ Preparation of protium and prothium oxide. L. M. Yaki-  
menko, A. I. Shatenshteln, M. A. Rabinovich, E. A.  
Yakovleva, Z. M. Borisova, and E. N. Zvyagintseva.  
Zhur. Neorg. Khim. 2, 2507-12(1957); cf. C.A. 51, 2487g.  
A continuous working app. consisting of a single electrolysis  
step and a 10-step isotopic exchange assembly was designed  
for the prepn. of H<sup>1</sup> from water. Protium thus produced  
contained <0.00001 atom % H<sup>2</sup> and was further allowed to  
react with the O of the air to yield "zero water standard"  
H<sub>2</sub>O. The 24-hr. capacity of the set-up was 0.5 l. H<sub>2</sub>O.  
This zero water standard was shown to be suitable for the  
analysis of H<sup>1</sup> in natural waters and in the detn. of the value  
of Debye correction (C.A. 47, 12d). Detailed diagrams of  
the app. are given. A. P. Koloby

~~SHATENSHTEYN, A.I.; ZVYAGINTSEVA, Ye.N.; YAKOVLEVA, Ye.A.; IZRAILEVICH, Ye.A.;~~  
~~VARSHAVSKIY, Ya.M.; LOZHKINA, M.G.; VKDENEYEV, A.V.~~

Acid-base catalysis of the hydrogen isotope exchange reaction. Probl.  
kin. i kat. 9:218-233 '57. (MIRA 11:3)  
(Catalysis) (Hydrogen--Isotopes)

SHATENSHTEYN, A.I.; IZRAILEVICH, Ye.A.

Obtaining organic deuterium compounds. Probl. kin. i kat. 9:430-  
440 '57. (MIRA 11:3)

(Deuterium)

SHATENSHTEYN, A. I.

17  
*Plu. 31*  
*Chen*  
 Isotope analysis of water. II. New liquids for the drop method of isotope analysis of water with a deuterium concentration of up to 100 atomic percent. A. I. Shatenshteyn, E. A. Yakovleva, E. N. Gladkova, S. F. Suzdal'tseva, and N. P. Antipova. *Zhur. Atom. Khim.* 12, 115-17 (1957); cf. C.A. 51, 8483c. — For isotope analysis of water diphenylmethane and its mixts. with  $\alpha$ -chloronaphthalene are suggested. Diphenylmethane is used for D concns. of 8-27 at. % and the mixts. are used for 20-100 at. % D. M. Hosh.

7  
 1-1000  
 1-9000

RMP fra  
 MT

SHATENSHTEYN, A.I.; VARSHAVSKIY, Ya.M.

~~Methods for isotopic analysis of water. Report No.3. The complete isotopic analysis of water by decomposition with iron [with summary in English]. Zhur.anal.khim. 12 no.2:236-239 Mr-Apr '57. (MLRA 10:7)~~

1. Fiziko-khimicheskiy institut im. L.Ya. Karpova, Moskva.  
(Water--Analysis) (Oxygen--Isotopes) (Hydrogen--Isotopes)

SHATENSHTEYN, A.I.

✓Methods of isotope analysis of water. IV. Method of  
complete isotope analysis of water. A. I. Shatenshteyn, E.  
A. Yankovleva, S. P. Suzdal'seva, and N. P. Antikova (L.  
Ya. Karpov Phys.-Chem. Inst., Moscow). *Zhur. Anal.  
Khim.* 12, 398-401 (1957); cf. C.A. 51, 11171c, 16008d;  
52, 168g. The method consists of detg. the d. of the  
H<sub>2</sub>O before and after the O isotope compn. of the H<sub>2</sub>O is nor-  
malized. The normalization is accomplished by passing the  
H<sub>2</sub>O vapors mixed with atm. O (fed from a cylinder) over  
MnO<sub>2</sub> at 600-750°. Prior to its mixing with the H<sub>2</sub>O vapors  
the O is thoroughly dried. The d. is detd. by the drop  
method (*loc. cit.*). V. Float method of  $\pm 0.2 \gamma$  accuracy.  
A. I. Shatenshteyn and E. N. Zvyagintseva. *Ibid.* 518-22.  
The claimed accuracy is made possible by using an improved  
design app., a thermostat with a temp. control of  $\pm 0.0005^\circ$   
and careful purification of the sample. The app. is described  
in detail and dimensions are given. The H<sub>2</sub>O sample is puri-  
fied by subjecting it to: oxidation of impurities in alk.  
medium, distn., oxidation of impurities in acid medium,  
distn., and redistn. All the operations are carried on out of  
contact with the atm. in a stream of N<sub>2</sub>. The entire pro-  
cedure is given step by step. The accuracy of the method is  
 $\pm 0.0002$  at. % D or O<sup>18</sup>.  
M. Hosh

SHATENSHTEYN, A.I.; ZVYAGINTSEVA, Ye.N.

Methods of isotopic analysis of water. Part 5: A float method with an accuracy of  $\pm 0.2$  [with summary in English]. Zhur.anal.khim. 12 no.4:516-522 J1-Ag '57. (MIRA 10:10)

1.Fiziko-khimicheskiy institut im. L.Ya. Karpova, Moskva.  
(Water--Analysis)

SHATENSHTEYN, A-I.

JOURNAL OF ANALYTICAL CHEMISTRY  
Vol XII, Nr 4, 1957

METHODS FOR ISOTOPIE ANALYSIS OF WATER

COMMUNICATION 8. A FLOAT METHOD FOR MEASURING DENSITY DIFFERENCE  
WITH AN ACCURACY WITHIN  $\pm 0.2\%$

*Chem. Sci.*  
A. I. Shatenshtein and E. N. Zvyagintsev

L. Ya. Karpov Physico-Chemical Institute, Moscow

A float method for measuring density difference is described. The method permits the isotopic analysis of natural waters with an accuracy within 0.0002 atomic per cent of D or  $O^{18}$ .

A thermostat is described, with which a constant temperature within 0.0005° can be secured.

*RML aarb*



AUTHOR SHATENSHTeyN, A.I., Doctor of Chemistry. 30-7-27/36  
 TITLE Scientific Meetings, Conferences and Consultations.  
 The Influence of the Medium on Chemical Reactions.  
 (Vliyaniye sredy na khimicheskiye reaktsii - Russian)  
 PERIODICAL Vestnik Akademii Nauk SSSR, 1957, Vol 27, Nr 7, pp 101-104 (U.S.S.R.)  
 ABSTRACT Consultation from May 10 to 14 in Moscow on the problem: "The theory of chemical structure, kinetics and reactivities." Shatenshteyn and Svyantsev found out that the rules governing the reactions which occur in connection with the isotopic substitution of hydrogen and which also belong to the protolytic conversions, are dependent on the peculiarities of the intramolecular influence of the solvent on the organic substance participating in the substitution. This follows from the comparison of the kinetic phenomena of the reactions occurring on substitution of hydrogen in hydrocarbons, ketones and methylated heterocyclic compounds in amphoteric solutions, aliphatic alcohols and liquid ammonia, where the acid-alkaline catalytic finding result are given. Izmaylov's theory reads: The action of the solution on the strength of the electrolyte essentially depends on the chemical and physical properties of the dissolved substance and of the solvent. If a suitable solvent is chosen it is possible to perform the partial titration of acids, bases and salts that are equal or similar with regard to strength. Vasilyev talked on the kinetic results from the oxidation of acetaldehyde with the aid of acetylperoxide.

Card 1/2

30-7-27/36

The Influence of the Medium on Chemical Reactions.

He explained the oxidation by the occurrence of a hydrogen bond between the molecules of several solvents and the molecule of the peroxide. Several scientists reported on the above-mentioned theory. Rudakov and Voyevodskiy talked on the kinetics of the hydrolysis of tertiary chlorobutyl in various solutions and their mixtures. The analysis shows that six to twelve hydrogen molecules participate in the elementary act of the hydrolytic reaction. A strong participation in the discussion was characteristic of this consultation. All problems touched upon in the papers were concretely discussed.

ASSOCIATION      Not Given.  
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Card 2/2

SHATENSHTSYN, A.I.

V Investigation of hydrogen exchange with liquid deuterium fluoride Ya. M. Vershatskiy, M. G. Loshkins, and A. I. Shatenshteyn (L. Ya. Kargin Inst. Phys. Chem., Moscow). Zh. Fiz. Khim. 31, 1377-80 (1957). Quant. information on the soly. of 40 org. substances at 20-50° largely confirmed the results of Fredenhagen, *et al.* (cf. C.A. 24, 2938; 27, 3381; 28, 4046) and Klatt (cf. C.A. 29, 6858; 31, 5705; 32, 1164), except that Ph<sub>2</sub>O was sol. in HF and that the color of some solns. and the effect of BF<sub>3</sub> on the color were different from those reported by Klatt. The distribution coeff. of D between the aromatic C-H bonds and HF was 1.16 at 20°. The rate of H exchange between DF and the aromatic H hydrocarbons C<sub>6</sub>H<sub>6</sub>, naphthalene, phenanthrene, anthracene, and toluene and some satd. aliphatic hydrocarbons (methylcyclopentane, methylcyclohexane, Decalin, etc.) was detd. BF<sub>3</sub> catalyzes the isotope exchange; higher dielec. const. and polarity of the sol. of the solvent increases the rate of the isotope exchange, whereas the conversion of the substance into a pos. ion impedes an exchange of H. The presence of a tertiary C atom and CH<sub>3</sub> groups in a mol. of satd. hydrocarbons are not prerequisites for the exchange. W. M. Sternberg

5  
2

PM

Distr: 4E4j/4E3d

AUTHORS: Shatenshteyn, A. I., and Zvyagintseva, Ye. N. 20-117-5-35/54  
of Intramolecular

TITLE: On the Influence of the Properties/Interaction on the Rules of  
Deuterium Exchange (O vliyani osobennostey mezhdumolekulyarnogo  
vzaimodeystviya na zakonornosti deytiroobmena).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 5, pp. 852-855 (USSR).

ABSTRACT: The present paper shows the following: It is possible to explain the  
greater velocity of the hydrogen exchange with the amphoteric sol-  
vents (quinoline and picoline) by a modification of the valence sta-  
te of the nitrogen atom in these methylated heterocyclic compounds,  
(as opposed to the protophilic liquid ammonia). Up to now, an imme-  
diate comparison of the velocity of the deuterium exchange with al-  
cohols and liquid ammonia was missing. The present investigation,  
therefore, is conducting experiments with hydrocarbons (indene and  
fluorene) and with ketones (acetophenone and  $\beta$ -naphthylmethyl ketone).  
Above all, it was shown, that the same hydrogen atoms are exchanged  
with both solvents, that is to say, the atoms of the  $\text{CH}_2$  group in the  
indene and the fluorene, and the atoms of the  $\text{CH}_3$  group in the re-  
maining substances. The deuterium introduced into the substance by  
an exchange with  $\text{C}_2\text{H}_5\text{OD}$  was washed out in a subsequent treatment with

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the Properties of  
On the Influence of Intramolecular Interaction on the Rules of  
Deuterium Exchange.

20-117-5-35/zh

liquid ammonia. (invers exchange). A marginal observation is shortly discussed. The exchange of hydrogen in hydrocarbons and in ketones takes place much faster with liquid ammonia at low temperatures than with ethanole. Numerical data on these processes are given. The experiments on the inverse exchange were conducted with quinaldine, which previously was deuterised. By means of a determination of the physical constants it was proved, that the substances do not change during the experiments. A few of the substances given here behave like very weak acids at a dissolution in liquid ammonia. The results obtained here speak in favour of the fact, that the velocity of the exchange reaction increases at an increase of the polarity and of the concentration of the complex with the heterocyclic part. A comprehensive survey of the facts discussed in this paper proves, that the rules of the deuterium exchange show a strong dependence on the peculiarities of the intramolecular interaction in the solutions. There are 1 figure, 1 table, and 12 references, 6 of which are Slavic.

ASSOCIATION: Physical-Chemical Institute imeni L. Ya. Karpov (Fiziko-khimicheskiy institut imeni L. Ya. Karpova).  
PRESENTED: May 24, 1957, by A. N. Terenin, Academician.  
SUBMITTED: May 14, 1957.

Card 2/2

SHATENSHTEYN, A. I. and VEDENEV, A. V. (Physicochemical Inst. im. L. Ya. Karpov)

"Investigation of the Interaction of Atoms by the Deutero-Exchange Method" (Phenol and its Ethers and Aromatic Amines.) p. 7.

Isotopes and Radiation in Chemistry, Collection of papers of  
2nd All-Union Sci. Tech. Conf. on Use of Radioactive and Stable Isotopes and  
Radiation in National Economy and Science, Moscow, Izd-vo AN SSSR, 1958, 380pp.

This volume published the reports of the Chemistry Section of the  
2nd AU Sci Tech Conf on Use of Radioactive and Stable Isotopes and Radiation  
in Science and the National Economy, sponsored by Acad Sci USSR and Main  
Admin for Utilization of Atomic Energy under Council of Ministers USSR  
Moscow 4-12 Apr 1957.

*SHATENSHTEYN, A. I.*

64-1-18/19

AUTHOR: Malyusov, V. A.

TITLE: Scientific Conference at the Institute for Physical  
Chemistry Imeni L. Ya. Karpov  
(Nauchnaya konferentsiya v Fiziko-khimicheskom institute  
imeni L. Ya. Karpova)

PERIODICAL: Khimicheskaya Promyshlennost', 1958, Nr 1, pp. 56-56 (USSR).

ABSTRACT: At the end of November, 1957, a meeting of the scientific session of the scientific council took place in the above mentioned institute in honour of the 40th anniversary of the great socialist October Revolution. 19 contributions of the most interesting works carried out of lately in this institute were delivered. The corresponding member of the AN USSR, professor S. S. Medvedev, gave a report on the investigation of the general rules governing the emulsion polymerization. The active member of the AN USSR, professor V. A. Kargin reported on new observations in structural polymers. The corresponding member of the AN USSR, professor K. A. Kocheshkova reported on investigations in the field of organic lithium compounds. The corresponding member of the AN USSR, N. A. Kazarnovskiy, reported on peroxide compounds of the alkaline metals, Prof., A. I.

SHATENSHTEYN, On "The Isotopic Reactions with Deuterium in Anhydrous Solutions,"

SHATENSHTEYN, A. I.

AUTHORS: Shatenshteyn, A. I., Dubinskiy, Yu. G., 62-1-20/29  
Yakovleva, E. A., Gostunskaya, I. V., Kazanskiy, B. A.

TITLE: Catalytic Reactions on the Surface of Solid Amides of Calcium and Potassium (O katalicheskikh reaktsiyakh na poverkhnosti tverdykh amidov kal'tsiya i kaliya)

PERIODICAL: Izvestiya AN SSSR Otdeleniya Khimicheskikh Nauk, 1958, Nr 1, pp. 104-106 (USSR)

ABSTRACT: In the investigation of the deuterioexchange in alkenes, catalyzable by means of the solution of potassium amide their isomerization (in the dislocation of the double compound) was found. The isomerization also catalyzes the solid amide of calcium in case that the solvent is not present. The isomerization of the alkenes belongs to the few examples of reactions which occur in alkaline catalysis. It is assumed that the isomerization leads through the stage of carbonion formation. There is no doubt a common characteristic of the reasons for isomerization reactions in the deuterioexchange and their belonging to the class of basic acid reactions. They are catalyzed by the ions of the amide in ammonia solutions and the solid amides under heterogeneous conditions.

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There are 1 figure, and 11 references, 8 of which are Slavic.



Catalytic Reactions on the Surface of Solid Amides of Calcium 62-1-20/29  
and Potassium

ASSOCIATION: Physicochemical Institute imeni L. Ya. Karpov, and State University imeni M. V. Lomonosov (Fiziko-khimicheskiy institut imeni L. Ya. Karpova i Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova)

SUBMITTED: July 12, 1957

AVAILABLE: Library of Congress

1. Amides-Catalytic properties

Card 2/2

BROUDE, V.L.; IZRAILEVICH, Ye.A.; LIBERMAN, A.L.; ONOPRIYENKO, M.I.; PAKHOMOVA,  
O.S.; PRIKHOT'KO, A.F.; SHATENSHTEYN, A.I.

Electron spectra of aromatic hydrocarbons and their deuterium  
derivatives at 20°. Opt. i spektr. 5 no. 2:113-122 Ag '58.

(MIRA 11:10)

1. Institut fiziki AN USSR, Fiziko-khimicheskiy institut imeni  
Karpova.

(Hydrocarbons--Spectra)  
(Low temperature research)

SHATENSHTeyN, A.I.

Deuterium exchange in aqueous solutions. Probl.fiz.khim.  
no.1:202-211 '58. (MIRA 15:11)

1. Laboratoriya izotopnykh reaktsiy Nauchno-issledovatel'skogo  
fiziko-khimicheskogo instituta im. Karpova.  
(Deuterium)

AUTHORS: Varshavskiy, Ya. M., Shatenshteyn, A. I. 75-13-3-6/27

TITLE: A Photographic Method for Measuring the Color Intensity of  
a Solution in Small Volumes (Fotograficheskiy metod izmereniya  
intensivnosti okraski rastvora pri malykh ob'yemakh)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol 13, Nr 3,  
pp 294 - 298 (USSR)

ABSTRACT: For determining very small amounts of a compound by means of  
ultramicrochemical methods (References 1,2) microspectro-  
photometry can also be successfully employed, as due to its  
high sensitivity it is possible to work with very diluted solu-  
tions. In publications some types of microcuvettes were descri-  
bed which can in connection with a photometer (mainly with the  
electrical spectrophotometer CФ-4) be used for measuring the  
color intensity of very small amounts in a solution (References  
3,4). In the present paper a simple device for a photographic  
method of measuring the color intensity of a solution is de-  
scribed. Capillary cuvettes with a volume of 0,05-0,1 ml were  
used. 2 cuvettes, one of them containing the solution to be in-  
vestigated, and the other a comparison solution with lower color

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A Photographic Method for Measuring the Color Intensity of a Solution in Small Volumes 75-13-3-6/27

intensity are directly beside each other fastened in front of a photographic plate (the axis of the capillary cuvettes lie at a right angle to the plate). A beam of parallel light rays first goes through the cuvettes and then blackens the plate. The intensity of blackening depends on the light used and on the concentration of the solution. In front of the comparison cuvette a controllable light-absorption device is fastened by which an equal blackening of the plate for both cuvettes can be obtained. The absorption of the solution to be investigated is then equal to the absorption of the light-absorption device. When the corresponding absorption is determined for every position of the light-absorption device the concentration of the solution to be investigated can be immediately determined from Beer's law without using a calibration curve. The construction of the device used, which is drawn in the paper, is described in detail. The cuvettes, the light-absorption device and the measuring method are also described in detail. There are 4 figures and 5 references, 3 of which are Soviet.

Card 2/3

A Photographic Method for Measuring the Color Intensity 75-13-3-6/27  
of a Solution in Small Volumes

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva  
(Moscow, Physical-Chemical Institute imeni L. Ya. Karpov)

SUBMITTED: June 21, 1956

1. Solutions--Spectrographic analysis

Card 3/3

AUTHORS: Shatenshteyn, A. I., Yakovleva, Ye. A. SOV/79-28-7-1/64

TITLE: The Velocity Comparison of the Hydrogen Conversion Under the Participation of Protophilic Solvents (Sravneniye skorosti vodorodnogo obmena s uchastiyem protofil'nykh rastvoriteley)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 7, pp. 1713 - 1723 (USSR)

ABSTRACT: In earlier papers the authors showed that the parallel investigation of the hydrogen conversion with acid and basic solvents makes it possible to draw rather comprehensive conclusions as to the reactivity of the organic compounds, and to explain the rules governing the conversion of hydrogen (Ref 1). For explaining this mechanism it is of interest to compare the reactions of the deuterio conversion of the dissolved body with solvents of the same chemical nature which differ, however, by their protolytic activity and their physical constants; the magnitude of the dielectric constant of the solvent as well as the magnitude of the dipolar moment are of great importance. The present paper deals with the differing velocities of the hydrogen conversion which are to be compared of a number of bodies

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The Velocity Comparison of the Hydrogen Conversion  
Under the Participation of Protophilic Solvents

SOV/79-28-7-1/64

with liquid ammonia and other protophilic solvents, as there are hydrazine, ethylene diamine and ethanolamine (Table 1). Using the mentioned tables and figures the following can be learned from this paper:

The synthesis of the anhydrous deuterized hydrazine, ethylene diamine and ethanol amine, the methods of their isotopic analysis and the carrying out of the experiments of the isotopic conversion of hydrogen with them are described. The velocity of the isotopic conversion of hydrogen in fluorene, triphenylmethane, diphenylmethane and quinaldine with the mentioned solvents and liquid ammonia were determined. The causes of the high hydrogen conversion velocity with hydrazine and ethylene diamine as opposed to liquid ammonia were discussed. The characteristic features of the deuterio conversion with ethanol amine are explained in detail by the fact that this electron emitting compound (donor) can also react as an acceptor of protons (deuterons). It was shown that the catalytic activity of a base depends to a high degree on the nature of the solvent. There are 4 figures, 5 tables, and 11 references, 9 of which are Soviet.

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The Velocity Comparison of the Hydrogen Conversion  
Under the Participation of Protophilic Solvents

SOV/79-28-7-1/64

ASSOCIATION: Fiziko-khimicheskiy institut imeni L.Ya.Karpova (Physico-  
chemical Institute imeni L.Ya.Karpov)

SUBMITTED: June 12, 1957

1. Hydrogen--Chemical reactions
2. Chemical reactions--Velocity
3. Organic solvents--Chemical effects
4. Catalysts--Performance
5. Deuterated hydrazines--Synthesis

Card 3/3

SOV/79-28-10-3/60

AUTHORS: Shatenshteyn, A. I., Vedeneyev, A. V.,  
Alikhanov, P. P.

TITLE: Hydrogen Reaction of Phenol, Its Ethers and of the Aromatic  
Amines With Liquid DBr (Vodorodnyy obmen fenola, yego efirov  
i aromaticeskikh aminov s zhidkim DBr)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 26, Nr 10,  
pp 2638 - 2644 (USSR)

ABSTRACT: Shatenshteyn and his collaborators had earlier found  
the rules governing the deuterio reaction in hydrocarbons  
dissolved in liquid DBr (Refs 1,2). In this paper the  
results are given which were obtained in the hydrogen  
reaction with liquid DBr in aromatic compounds that  
contain substituents with an oxygen or nitrogen atom.  
The free electron pairs of oxygen or nitrogen of the  
substituents are in mesomeric relation to the  $\pi$ -electrons  
of the aromatic nuclei, which fact causes an increase  
of the electron density in the ortho and para-atoms  
(Ref 4). The affiliation of the proton (deuteron)  
to the electron pair of the nitrogen or oxygen atom  
causes its transition to the quaternary or ternary ion

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Hydrogen Reaction of Phenol, Its Ethers and of the  
Aromatic Amines With Liquid DBr

SCV/79-28-10-3/60

with simple positive charge. These characteristic features of the compounds mentioned above are the decisive characteristics in their deuterio reaction with acids. The hydrogen reaction on phenol and its ethers ( $C_6H_5OCH_3$ ,  $C_6H_5OC_6H_5$ ) and on aromatic amines ( $C_6H_5N(CH_3)_2$ ,  $(C_6H_5)_2NH$ ,  $(C_6H_5)_3N$ ] with liquid DBr as well as with  $DBr+AlBr_3$  were investigated at  $25^\circ$ . In all compounds of the first group the ortho and para-atoms react immediately whereas in the second group this rapid reaction takes place only with  $(C_6H_5)_3N$ , with all others only slowly or not at all.  $AlBr_3$  causes the reaction of the meta-atoms in the phenol ethers and delays the reaction in  $(C_6H_5)_3N$ . The different behaviour of compounds containing oxygen and nitrogen in the hydrogen reaction with  $DBr+AlBr_3$  depends on their different relation to the proton and on the different coordination capability of oxygen and nitrogen atoms.

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Hydrogen Reaction of Phenol, Its Ethers and of the  
Aromatic Amines With Liquid DBr

SOV/79-28-10-3/60

There are 3 tables and 17 references, 10 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut imeni L.Ya.Karpova (Physical  
Chemical Institute imeni L.Ya.Karpov)

SUBMITTED: August 20, 1957

Card 3/3

AUTHORS: Skatenshteyn, A. I., Vedeneyev, A. V. SOV/79-28-10-4/60

TITLE: Hydrogen Reaction of Phenol and Its Ethers With the Solutions of Potassium Amide in Liquid Deutero Ammonia (Vodorodnyy obmen fenola i yego efirov s rastvorami amida kaliya v zhidkom deyteroammiake)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 10, pp 2644 - 2652 (USSR)

ABSTRACT: In continuation of the earlier paper (Ref 1), this one describes the hydrogen reactions of phenol and its ethers with  $KND_2$  solutions in liquid  $ND_3$ . They supplement the idea of the authors on the interaction of the atoms in the molecules of the compounds mentioned and make it possible to draw some conclusions as to the mechanism of the hydrogen reaction. All hydrogen atoms react with the  $KND_2$  solution in liquid  $ND_3$  in the phenolate ion, diphenyl ether and anisole. As the amide ion is of a highly basic character the difference in the acidity and reactivity is balanced in the reaction of the hydrogen

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Hydrogen Reaction of Phenol and Its Ethers With the  
Solutions of Potassium Amide in Liquid Deutero Ammonia

SOV/79-28-10-4/60

atoms of different valence of the aromatic nuclei of the compounds mentioned. In the phenolate ion the velocity of the hydrogen reaction is three times lower than in benzene. The hydrogen in diphenyl ether reacts much more rapidly than in benzene. The velocity of its reaction in anisole subsequently decreases according to the scheme: ortho > meta > para  $\text{OCH}_3$ ,

with the main role not being played by the  $\pi$ -effect of the p-bond but by the induction effect of the oxygen of the methoxy group. The oxygen of this group reacts more slowly than the para-atom of the aromatic nucleus of anisole. Methods were suggested for the production of some deuterium anisoles  $\text{C}_6\text{D}_5\text{OCD}_3$ ;  $\text{C}_6\text{H}_5\text{OCD}_3$ ; 2,4,6- $\text{C}_6\text{D}_3\text{H}_2\text{OCH}_3$  and others, with the reactions having been carried out in different solvents. There are 1 figure, 5 tables, and 17 references, 10 of which are Soviet.

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Hydrogen Reaction of Phenol and Its Ethers With the  
Solutions of Potassium Amide in Liquid Deutero Ammonia

SOV/79-25-10-4/60

ASSOCIATION: Fiziko-khimicheskiy institut imeni L.Ya.Karpova (Physico-  
Chemical Institute imeni L.Ya.Karpov)

SUBMITTED: August 20, 1957

Card 3/3

AUTHORS: Shatenshteyn, A. I., Izrailevich, Ye. A. SOV/79-28-11-8/55

TITLE: On the Protonic Mobility of the Hydrogen Atoms in Aromatic Hydrocarbons With Aliphatic Substituents (O protonnoy podvizhnosti atomov vodoroda v aromaticheskikh uglevodorodakh s alifaticheskimi zamestitelyami)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 11, pp 2939-2943 (USSR)

ABSTRACT: Owing to the protonic mobility the hydrogen atoms are capable of being substituted by deuterium or tritium on the action of bases enriched with these isotopes, as well as by alkali metal, and of taking part in various organic reactions (condensations etc.). The degree of mobility of the hydrogen atoms does not only depend on the structure of the compound but also on the question with which other compound and under which conditions the reaction takes place. For this reason various methods were devised for the determination of the mobility of the hydrogen of different sensitivity. The substitution by metal belongs to the most sensitive ones, this substitution, however, changes in the case of the alkali metal the reactivity of the compound in such a degree that

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On the Protonic Mobility of the Hydrogen Atoms in  
Aromatic Hydrocarbons With Aliphatic Substituents

SOV/79-28-11-8/55

the subsequent metallization meets with difficulties even in the case where C-H bonds of equal valence are present in the initial product. The difference and the advantage of the isotopic reaction are represented by the fact that in it all hydrogen atoms that are mobile according to the conditions of the experiment take part in it. The sensitivity of the substitution reactions is sufficiently high in the case of a high protophilic behaviour of the reagent. For this reason, the authors employ the isotopic method for the classification of the protonic mobility of the hydrogen atoms in aromatic compounds with aliphatic substituents by using solutions of potassium amide in liquid deuterio-ammonia for the deuteration (Refs 1-5). The experiments described in the experimental part show that in aromatic hydrocarbons with aliphatic substituents (alkyl benzenes, phenylated alkanes etc.) the hydrogen atoms of the aromatic nucleus and the atoms connected with the  $\alpha$ -carbon atom of the substituent (in the catalysis with potassium amide in liquid ammonia) are substituted by deuterium. The combined hydrogen atoms connected with the  $\beta$ -carbon of the substituent are considerably less mobile

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On the Protonic Mobility of the Hydrogen Atoms in  
Aromatic Hydrocarbons With Aliphatic Substituents

SOV/79-28-11-8/55

and in the hydrogen substitution react only at higher  
temperature and higher concentration of the amide, as well  
as in the case of a longer duration of the experiment. There  
are 1 table and 12 references, 10 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut imeni L. Ya. Karpova (Physico-  
Chemical Institute imeni L. Ya. Karpov)

SUBMITTED: June 12, 1957

Card 3/3

76-1-22/52

AUTHORS: Shatenshteyn, A. I. , Perejudov, G. V. , Izrailevich, Ye. A. ,  
Kalinachenko, V. R.

TITLE: Preparation of Some Deuterated Aromatic Hydrocarbons and Their  
 Raman Spectra (Polucheniye nekotorykh deyterirovannykh aromatiches-  
 kikh uglevodorodov i ikh spektry kombinatsionnogo rasseyaniya)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 1, pp.145-151 (USSR)

ABSTRACT: Some known preparations, as well as some ones of deuterated aroma-  
 tic hydrocarbons still not being mentioned in literature were ob-  
 tained, and their Raman spectra were measured by means of isotope  
 exchange of hydrogen with  $ND_3$  +  $KND_2$  or with liquid DBr. A compa-  
 rison between the Raman spectra of hexadeuterobenzene- and octa-  
 deuteronaphthalene preparations and those from the references 11,  
 12, 14 and 15 proves the identity of all preparations and fully  
 confirms the approbation of the new methods of preparation of deu-  
 terated hydrocarbons. The advantages of these new methods in rela-  
 tion to those of other authors are enumerated: rapid reaction, the  
 solvent is easily to be removed, possibility of a complete deuter-  
 ation of various aromatic-, aliphatic-aromatic- and ethylene-hydro-  
 carbons, as well as many other organic compounds. The advantage  
 on occasion of the deuteration by means of liquid DBr in relation

Card 1/1

76-1-22/32

Preparation of Some Deuterated Aromatic Hydrocarbons and Their Raman Spectra

to that one by means of liquid  $\text{ND}_3$  is the higher coefficient of the deuteration distribution between the Cu- and NBr bonds ( $\alpha = 3,0$ ) in comparison to  $\alpha = 0,9$  in CH- and NH bonds (see reference 18 and 21). In the presence of an equal quantity of heavy water, 25 times more of DBr than of  $\text{ND}_3$  is obtained, besides. The pure benzene- and toluene preparations placed at the disposal by A. L. Libernab served as initial substances. The liquid  $\text{ND}_3$  was prepared by the action of  $\text{D}_2\text{O}$  (99,6 atm.% D) upon  $\text{Mg}_3\text{N}_2$  (reference 2), whilst the liquid DBr was produced synthetically from the elements (reference 24). The technique of the experiment has been described in these references. Presently, the representation of the deutero-ammonia is simplified:  $\text{Mg}_3\text{N}_2$  and an ampule with heavy water are put into a steel balloon. A valve is screwed in into the latter one. By means of destroying the ampule the reaction between  $\text{Mg}_3\text{N}_2$  and  $\text{D}_2\text{O}$  is liberated. On occasion of the hydrogen exchange the substances exist in the solution. As a rule the potassium amide concentration is not great (0,02 N). The exchange reaction was carried out once more with new solvent portions at room temperature during a period, which guarantees the obtaining of the equilibrium in the exchange reaction. On occasion of the experiments with  $\text{C}_{10}\text{H}_8$  the number of the  $\text{ND}_3$  mo. amounted to 50-150 per mol of substance, whilst on occasion of the experiment with benzene

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76-1-22/32

Preparation of Some Deuterated Aromatic Hydrocarbons and Their Raman Spectra

and toluene per mol of substance only 20-40 mol of the solvent was taken, because these hydrocarbons (especially benzene) on occasion of distilling after the experiment are easily entrained by ammonia. In order to obtain preparations by means of isotope exchange with liquid DBr 1 g of the substance was dissolved in 15 - 22 g of liquid DBr. After evaporation of the solvent the liquid substances were distilled (above  $\text{CuSO}_4$ , in order to remove the  $\text{ND}_3$  traces, or above Na, in order to bind<sup>4</sup> DBr). Solid substances were distilled 2 - 3 times.

The spectra of the combined scattering (Raman spectra) were measured by means of a two-prism-spectrograph "Huet" with relative aperture 1 : 4,7 and a dispersion of  $100 \text{ cm}^{-1}$  in the range of  $4358 \text{ \AA}$ . In the following work the computations, and the interpretation of the spectra are given, and the values of the frequencies are presented. The Raman spectra of following substances were measured:  $\text{C}_6\text{D}_6$ ,  $\text{C}_{10}\text{D}_8$ ,  $\text{C}_{12}\text{D}_{10}$ ,  $\text{C}_6\text{D}_5\text{CD}_3$ , 1,4,5,8- $\text{C}_{10}\text{D}_4\text{H}_4$ , 2,3,6,7- $\text{C}_{10}\text{D}_4\text{H}_4$ , 2,4,6,2',4',6'- $\text{C}_{12}\text{D}_6\text{H}_4$  and 3,5,3',5'- $\text{C}_{12}\text{D}_4\text{H}_6$ .

The authors were advised by G. S. Landsberg, Academician, and Professor P. A. Bazhulin. P. N. Manochkina assisted. The density of

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Preparation of Some Deuterated Hydrocarbons and Their Raman Spectra 76-1-22/32

the preparations was measured by Yu. I. Antonchik. The preparations were placed at disposal by A. L. Liberman. There are 2 tables, and 24 references, 9 of which are Slavic.

ASSOCIATION: Physical-Chemical Institute imeni L. Ya. Karpov. AS USSR. Institute for Physics imeni P. N. Lebedev, Moscow  
(Fiziko-khimicheskiy institut im. L. Ya. Karpova. Akademiya nauk SSSR. Fizicheskiy institut im. P. N. Lebedeva. Moskva)

SUBMITTED: October 31, 1956

AVAILABLE: Library of Congress

Card 4/4

A. N. S. Gerasimov, Ya. I. Shatenshteyn, A. I. 76-32 6-16/47

TITLE: Yakov Iosifovich Ol'shanskiy (Yakov Iosifovich Ol'shanskiy)  
Obituary Notice (Nekrolog)

PERIOD CAL: Zhurnal fizicheskoy khimii 1958. Vol. 32, Nr 5.  
pp. 1136 - 1137 (USSR)

ABSTRACT: Yakov Iosifovich Ol'shanskiy, Doctor of Chemical Sciences,  
died at the age of 46 on January 6, 1958. He held lectures in  
the field of physical chemistry and dealt with the investigations  
in the field of the physical chemistry of high temperatures  
with relation to the theory of the formation of rocks and mi-  
nerals, these being an important contribution to the theory of  
the formation of magmatic sulfide deposits, as well as to the  
theory and practice of metallurgical processes. He developed  
some original theories for the equilibrium up to 2500°C. His  
last works dealt with the theory of the development of thermal  
waters, in which he showed that the solutions can display a migra-  
tion of substance, although they may be practically unsolvable;  
he also showed that a rearrangement of the particles in the solid  
phase takes place. In connection herewith he made some proposals

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... in ... Ol'khirskiy

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for the use of radioactive isotopes, and he published altogether about 40 works, including experimental works which he had carried out himself.

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1. Chemistry---USSR 2. Scientific personnel---USSR



5(4)

AUTHORS: Shatenshteyn, A. I., and  
Izrailevich, Ye. A.

SOV/76-32-12-9/32

TITLE: A Comparison Between Deuterium Exchange and the Metal Substitution in Alkyl Benzenes (Sravneniye deytiroobmena i metallirovaniya alkilbenzovol)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 12, pp 2711-2716 (USSR)

ABSTRACT: Toluene, ethyl benzene, isopropyl benzene, tertiary butyl benzene, and n-butyl benzene were treated with deuterium bromide at 0°, 10°, and 25°C in the presence of potassium amide. The deuterium substitution in the alkyl group was calculated from  $n_a = n - n_k$  ( $n_a$  - deuterium in the alkyl group;  $n$  - aggregated deuterium content, determined in the combustion product;  $n_k$  - deuterium in the ring, determined after oxidation into benzoic acid and combustion). The hydrogen atoms in the ring are harder to substitute than the alkyl group hydrogen atoms. Shorygin (Ref 11) discovered the metal substitution by means of organic alkali compounds. A. A. Morton (Ref 13) confirmed the difference in the reactivity of hydrogen in the sequence  $CH_3 > CH_2 > CH$ .

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A Comparison Between Deuterium Exchange and the  
Metal Substitution in Alkyl Benzenes

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The deuterium substitution shows the same regularities as the substitution by alkali metals as already stated by Ingold (Ref 1). In both cases the hydrocarbons act as weak acids with the basic reagent. Morton (Ref 18), however, gave a wrong interpretation in assuming that the reaction takes place by an electrophilic attack of the cation of the metal compound on the H-atom with increased electron density. J. D. Roberts and D.J. Curtin (Ref 21) assumed that the amide ion or the carbanion of the organic metal compound as a strong base attracts the H-atom in the form of a proton from the C-H binding. G. Wittig (Ref 24) and D. Bryce-Smith (Ref 16) confirmed this assumption. The decrease of electron density in the C-atom facilitates the extraction of the proton, whereas a high electron density has an inhibiting effect. The slowing down of the reaction in the ring of the alkyl benzenes is due to the indirect influence of the alkyl group. Bryce-Smith (Ref 16) showed that the ortho-position in the ring is deactivated to the greatest extent. M. I. Rikhter and P. N. Manochkina cooperated in the investigation. There are 4 tables and 30 references, 11 of which are Soviet.

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A Comparison Between Deuterium Exchange and the  
Metal Substitution in Alkyl Benzenes

SOV/76-32-12-9/32

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karпова, Moskva  
(Physico-Chemical Institute imeni L. Ya. Karпов, Moscow)

SUBMITTED: July 25, 1957

Card 3/3

SHALIMSHTEVA, A.I.; PRAVIKOVA, N.A.

Effect of complex formation on the properties of solutions of  
methyl ester polymers of methacrylic acid. Vysokom.sped. 1  
no.2:215-221 F '59. (MIRA 12:10)  
(Methacrylic acid)